California Department of Toxic Substances Control

COMPREHENSIVE FIELD DATA REVIEW

#1

In 1997, under the Department of Toxic Substances Control's (DTSC) oversight, a systematic investigation into contamination at the Santa Susana Field Laboratory (SSFL) began. This investigation (called a RCRA Facility Investigation) was based on investigation workplan reviewed and approved by DTSC in 1996. The investigation focused on suspected areas of contamination identified in the United States Environmental Protection Agency's (US/EPA) SSFL Site Assessment (the first step in the RCRA Corrective Process). In 1999, following assignment of additional personnel to the project, DTSC staff initiated a comprehensive field data review of the investigation data to insure potential data gaps were addressed early. All areas on the facility were systematically visited as part of the assessment process, including areas with no suspected contamination. This review incorporated historical aerial photographs of the SSFL dating back to the 1940s, systematic visiting of all buildings and activity areas, as well as records of chemical handling activities. As a result of this systematic review, additional areas of concern have been identified, and a significant expansion of field sampling and data collection analysis beyond the original workplan has been required. During this field effort, DTSC staff specified the type, number, location of all sample collection areas, and directed the collection of sample data by Boeing's environmental consultants. To date, over 5,000 samples have been collected and analyzed. Since 1999, DTSC technical staff have devoted more than 33,000 hours to oversight of permitting and corrective action activities at SSFL.

DTSC staff review fault trace and geology mapped by Boeing's environmental consultant, Dr. Ross Wagner, in the Coca test stand area.

Photo above shows DTSC staff inspecting exploratory trench and selecting sampling locations.

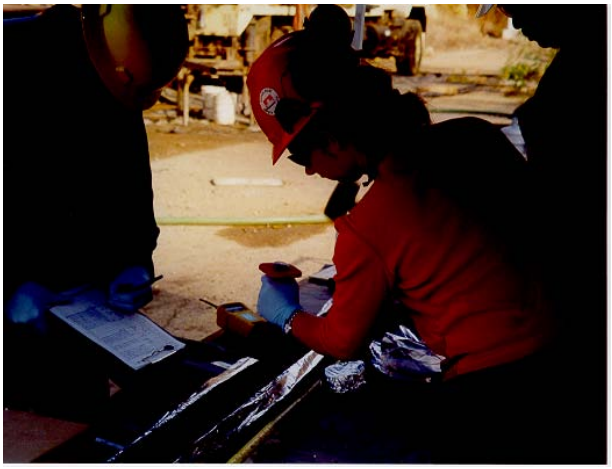
California Department of Toxic Substances Control

DEEP GROUNDWATER INVESTIGATION OF FRACTURED BEDROCK

#2

In 2000, DTSC approved an investigation into the fractured bedrock and deep groundwater at the SSFL. An investigation into fractured bedrock contamination of this size and scope has never been attempted before. Several new investigation techniques were developed and will be deployed for the first time.

Core drilling rig in Bowl rocket test stand area. Well boring was drilled to over 400 feet depth.. Over 350 rock subcores were collected and analyzed for solvents.



Within minutes after removal from the boring, core samples are logged by a geologist and prepared for analyses by a chemist.

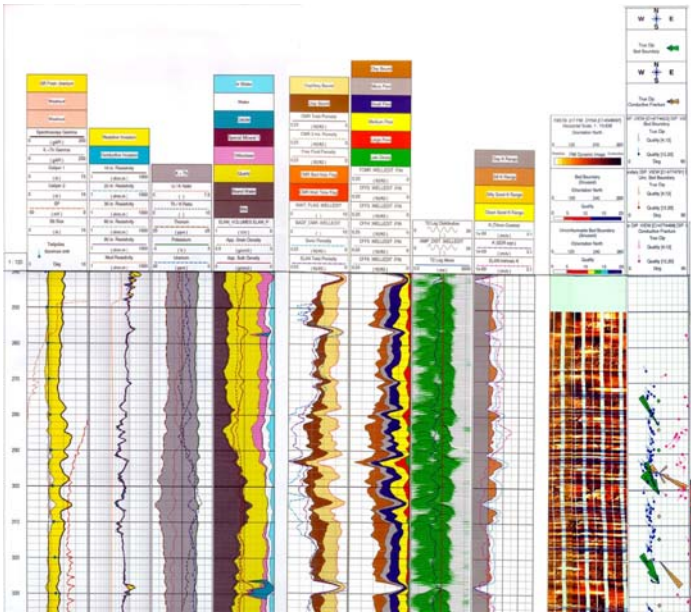
The multimillion dollar effort will evaluate the three dimensional distribution of contamination in the fractured bedrock, and will assess groundwater flow through the fractured bedrock beneath the facility. The first phase of the investigation will include the drilling and installation of continuously cored boreholes to depths in excess of 500 feet. An estimated 350 rock samples will be collected from each boring and analyzed for contamination.

California Department of Toxic Substances Control

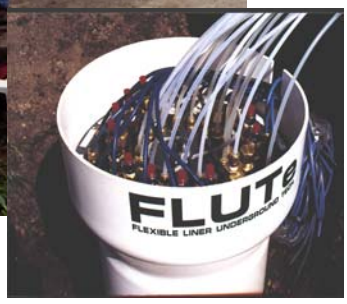
DEEP GROUNDWATER INVESTIGATION OF FRACTURED BEDROCK

#3

Newly installed well borings and approximately 100 currently existing wells at SSFL will be retrofitted with water sampling devices. Each well will contain up to 14 sampling ports and pressure transducers in order to study vertical and horizontal groundwater characteristics in three dimensions to the depth of contamination.



Above graph shows geophysical log of well boring used to evaluate rock properties. Photo below shows retrofitting of existing well with multiport sampling device in wells.



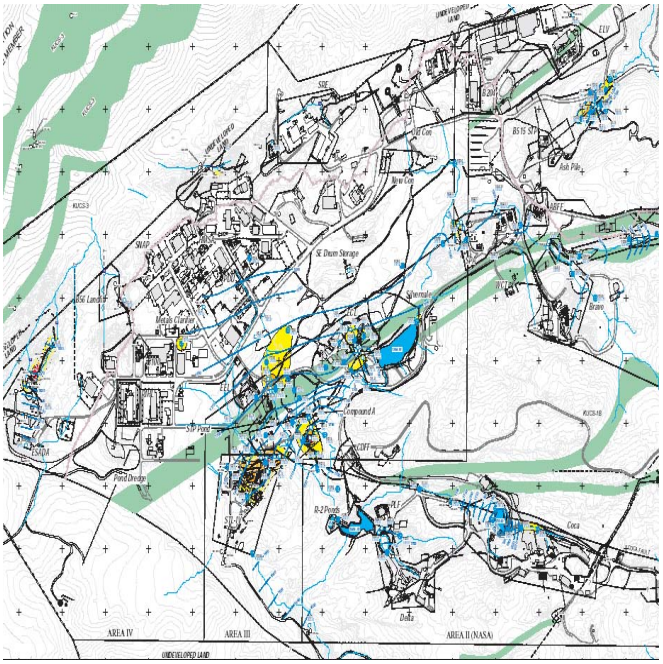
Prior to retrofitting, each well boring will be geophysically logged to evaluate rock properties. Slug tests and cross boring pumping tests will be conducted to evaluate hydraulic conductivity, rock fracture connectivity, and groundwater flow characteristics in the bedrock. Water quality data collected from the wells will be used to assess contaminant in the subsurface bedrock.

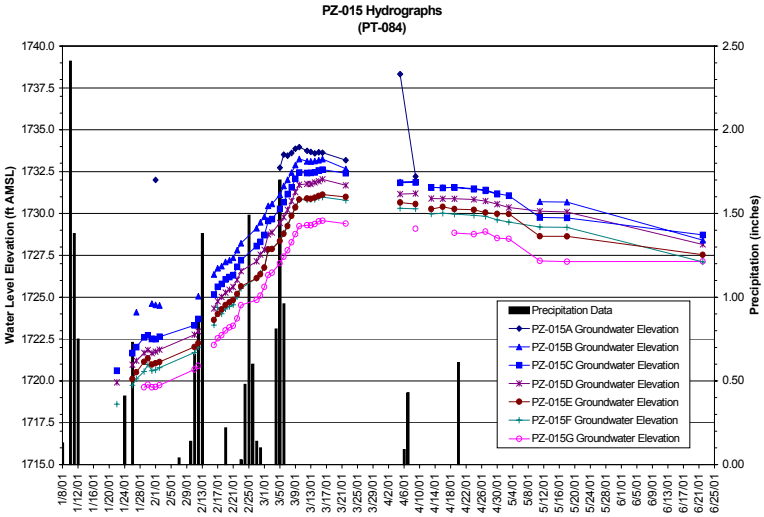
California Department of Toxic Substances Control

SHALLOW GROUNDWATER INVESTIGATION

#4

A comprehensive investigation of shallow groundwater was conducted at SSFL to identify and assess the flow, direction, and distribution of contaminants in shallow groundwater away from contaminant source areas. Field work for this investigation program began in October 2000. DTSC staff were onsite during the field investigation to observe drilling and well installation, select borehole depths, and specify the location of new wells. A total of 94 single and multi sampling groundwater pressure (piezometer) monitoring wells were installed, with 191 sampling ports. An additional 23 shallow groundwater pressure (piezometer) monitoring wells were installed in the fall of 2001. Data collection of borehole rock strata was performed at selected locations to optimize well design. Water level measurements were monitored daily from January through June during and following rain events.





Top photos: Hollow stem auger drilling rig installing shallow piezometers; rock core, and geophysical logging tool. Below and left photo: Water level data collected during winter months; map with piezometric data.

California Department of Toxic Substances Control

INTERIM MEASURES
SODIUM DISPOSAL FACILITY
#5

Excavation of Polychlorinated biphenyl's (PCB) and dioxin impacted soils from the Former Sodium Disposal Facility (FSDF) impoundments and channels was finalized in August 2000. Completion of the FSDF cleanup follows nine years of delay and controversy. The removal action is a significant accomplishment, and represents a major step towards the remediation and prevention of contamination movement down and along the channels below the FSDF. Following removal of the soils, the exposed bedrock surfaces were swept and vacuumed clean, and mapped for fractures and chemical residues. As a precautionary measure, a DTSC registered geologist took samples to confirm that soil and bedrock were remediated to the required health-based cleanup levels prior to installation of the engineered backfill.

Top photos: The upper impoundment covered by tarp prior to excavation in 1999; Excavation and removal of contaminated soil by hand crews in channels below impoundment; Excavation of the upper impoundment.

Top photo: removal of contaminated soil down to bedrock (upper impoundment).

California Department of Toxic Substances Control

INTERIM MEASURES
SODIUM DISPOSAL FACILITY
#6

Installation of a low water permeability engineered backfill cover was undertaken at the Sodium Burn Pit in October 2000. As part of the cover installation, soil moisture probes and water level gauges (pan lysimeters) were installed to monitor performance of the cover. Shallow monitoring wells have been installed in various areas of the cover to evaluate lateral (sideways) infiltration. The moisture probes record data from predetermined depths within the backfill cover 24 hours a day, 365 days a year. Data recorded during an above-normal rainfall event between January through March 2001 indicate that water has not penetrated through the cover.

Top photo: Installation of low permeability backfill cover; Left and bottom photos (left to right): Installation of monitoring drain; final cover grade (upper impoundment); final cover; data collection station - soil moisture probes monitor moisture content change. Data is collected 24 hours per day.

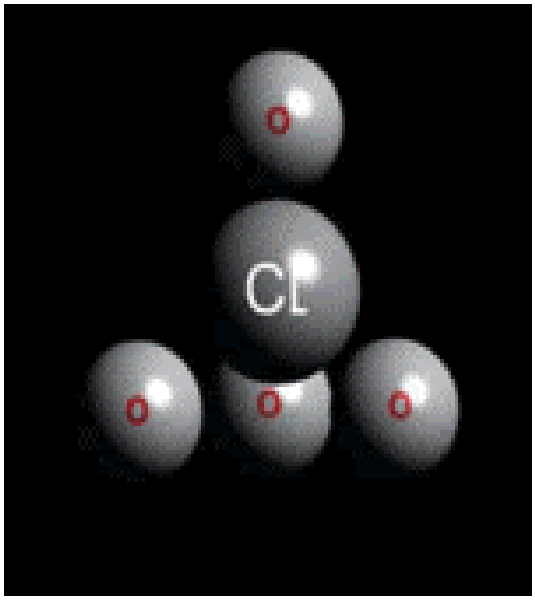
California Department of Toxic Substances Control

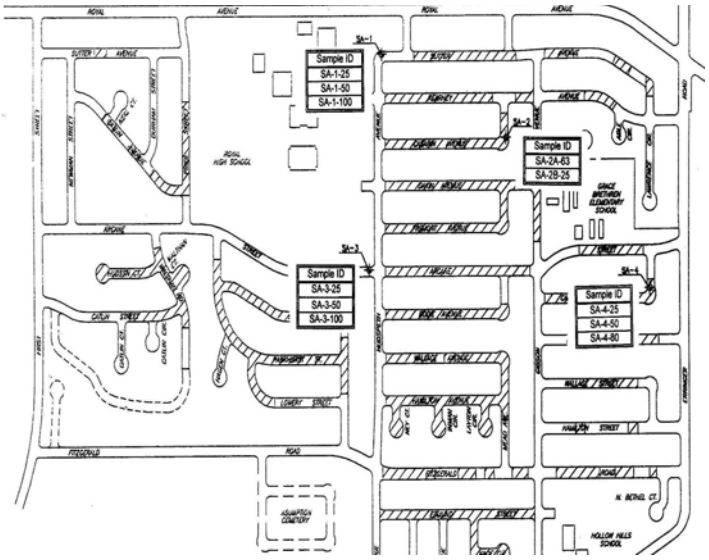
PERCHLORATE IN SIMI VALLEY GROUNDWATER

#7

What is Perchlorate?

Perchlorate is commercially produced as solid salts of ammonium, sodium and potassium. The chemical is used as an oxidizer in solid propellants for rockets, fireworks, munitions, also used to manufacture matches, and has reportedly been associated with some fertilizers. Perchlorate is water-soluble and exceedingly mobile in groundwater systems. It can persist for many decades under typical groundwater and surface water conditions because of its resistance to react with the surrounding environment. One of the concerns about perchlorate is the potential health effects at low levels in drinking water. Currently, the Department of Health Services uses an advisory action level of 4 micrograms per liter to protect drinking water consumers from adverse health effects. Perchlorate has not been detected in any drinking water supplies in Simi Valley.





Top photo: Model of a perchlorate molecule. Bottom left: Map shows locations of eleven de-watering wells tested in the vicinity of Royal Avenue and Erringer Road. Perchlorate was detected in one well on Caballero Street at 9.42 micrograms per liter. Ten other wells tested contained no detectable perchlorate. All of the above mentioned wells are <u>not</u> used for human consumption.

Previous Work Undertaken

In 1995 the City of Simi Valley installed 11 non-potable wells to monitor and de-water portions of the valley which routinely experienced flooding problems caused, in part, by a shallow water table. Perchlorate was detected at trace concentrations in one de-watering well on Casarin Avenue. Soon after, the US Environmental Protection Agency (EPA) re-sampled the same well and obtained similar results. The City of Simi Valley and the EPA asked the Department of Toxic Substances Control (DTSC) to review the data.

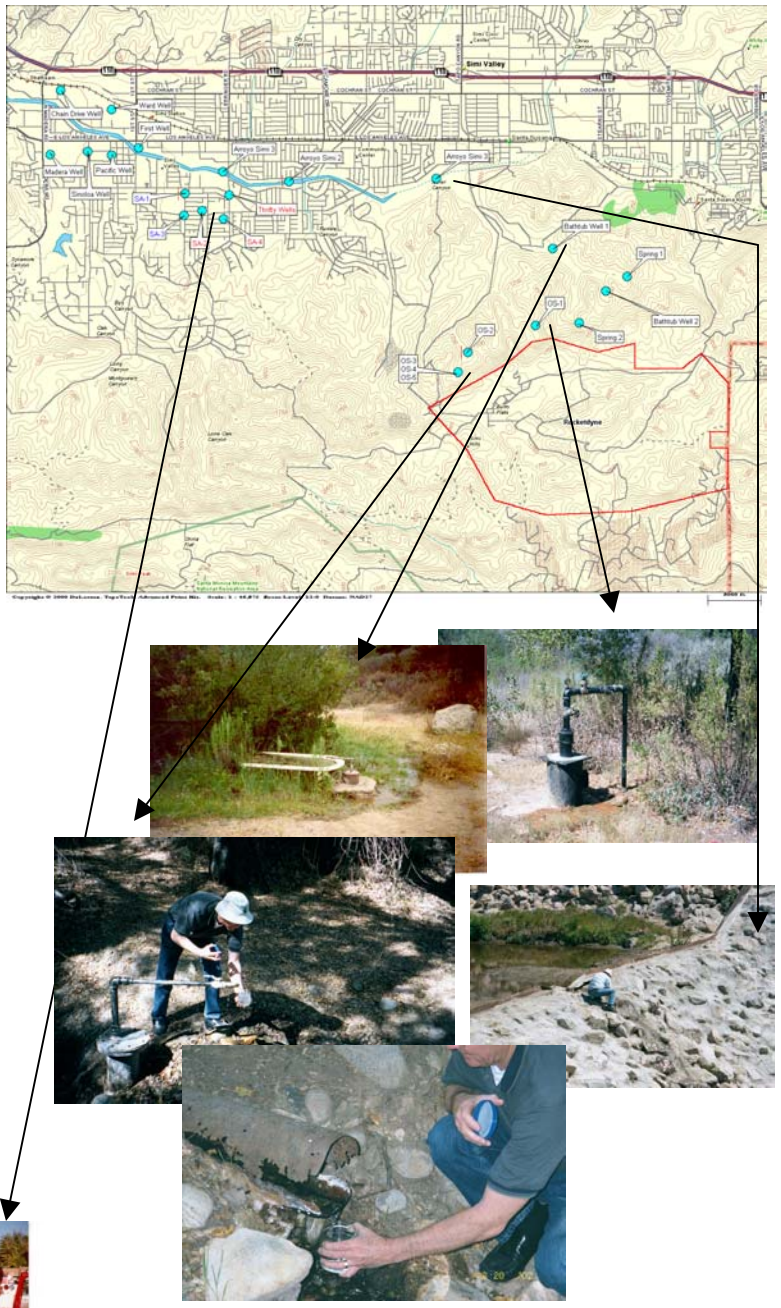
California Department of Toxic Substances Control

PERCHLORATE IN SIMI VALLEY GROUNDWATER

#8

DTSC Investigations Into Perchlorate

As part of the effort to define the source of perchlorate detected in Simi Valley, DTSC has collected and analyzed over 40 groundwater and surface water samples, researched county records and talked with community members to identify potential sampling points, and coordinated resources with the Los Angeles Regional Water Quality Control Board and the City of Simi Valley. All water samples were analyzed by DTSC's Hazardous Materials Laboratory. Results so far indicate perchlorate was detected in groundwater samples collected from 5 non-potable monitoring wells at concentrations ranging from 3.38 to 9.42 micrograms per liter (ug/L). Four of the wells are located at a former Thrifty Gas Station located at the corner of Erringer Road and Royal Avenue. One well is located on Caballero Street. These results prompted DTSC to collect an additional 24 samples between the Rocketdyne Facility and Simi Valley in March 2002. Results of the sampling are pending. Two drinking water supply wells owned by Southern California Water Company in Simi Valley are routinely sampled for perchlorate and contain no detectable concentrations. Perchlorate has not been detected in any drinking water supplies in Simi Valley.



Top : Map of Simi Valley, Simi Hills, and Rocketdyne (outlined in red). Blue dots represent recent DTSC groundwater or surface water locations sampled by DTSC. Photographs show artesian wells and springs on Brandeis Bardine Institute property where recent samples were collected. Left Photographs: Groundwater samples from Caballero Street well in Simi Valley.

California Department of Toxic Substances Control

PUBLIC PARTICIPATION ACTIVITIES

#9

The Department of Toxic Substances Control's (DTSC) public participation efforts at the Santa Susana Field Laboratory (SSFL) began in 1990. Due to the high level of public scrutiny regarding cleanup activities at the facility, the Department has devoted significant resources in responding to community questions and concerns. Ongoing outreach efforts have included numerous public meetings, fact sheets, and public notices.

Over the past year, current activities have focused on reviewing and developing DTSC's public participation strategy. To date, the following steps have been taken:

- Development of a community profile of residents living within a five-mile radius of the facility. This effort includes:

  - Mailing of 96,000 community surveys (3,500 + completed surveys returned)
  - Documentation of community concerns and comments
  - Development of a 5,000 + address facility mailing list
  - Demographic profile within an eight-mile radius of the facility
  - Community interviews and briefings

Based on the input received from the returned community surveys, the most frequently mentioned concerns and questions included:

- Protection of public health and the environment
- Confusion regarding which agency is responsible for different cleanup activities
- Difficulty at understanding the science associated with technical cleanup activities
- Frustration at the amount of time being taken to clean up the facility

A high level of mistrust of government agency decision-making exists within the community. DTSC is working to improve this situation by broadening public outreach, improving the circulation and quality of information, and by working with members of the SSFL Workgroup in promoting an environment of constructive dialogue and informative decision-making.

DTSC's Public Participation Program appreciates suggestions and recommendations on how to improve their outreach efforts. For further information regarding public participation activities, or to make suggestions on improving our approach, please contact Tim Chauvel at 818-551-2829, Fax: 818-551-2850, Email: tchauvel@dtsc.ca.gov.

LIST OF AGENCY CONTACTS

#10

Department of Toxic Substances Control (DTSC): DTSC is the regulatory agency in charge of investigating the release and cleanup of hazardous chemicals at the facility. For further information, contact: Mr.. Gerard Abrams, Telephone: (916) 255-3600, or Tim Chauvel, Telephone: (818) 551-2829.

Agency for Toxic Substances and Disease Registry (ATSDR): ATSDR has evaluated the SSFL for possible threats to public health from operations at the facility. For further information, contact: Hazardous Substances & Public Health, ATSDR, 1600 Clifton Road, NE, MS E33, Atlanta, GA 30333; telephone (404) 498-0112; fax (404) 498-0061, or their website at: www.atsdr.cdc.gov .

United States Environmental Protection Agency (EPA): The EPA has chaired the Santa Susana Field Laboratory (SSFL) Workgroup meetings formed in 1989. The State of California was authorized by the EPA to implement federal regulations governing cleanup of chemical contamination in soil and groundwater at the SSFL. For further information, contact: Mr. John Beach, Telephone: (415) 972-3347.

United States Department of Energy (DOE): DOE is the regulatory agency in charge of cleanup of radioactive contamination in Area IV of the Santa Susana Field Laboratory (SSFL). For further information, contact: Mr. Mike Lopez, Telephone: (510) 637-1633.

California Department of Health Services (DHS): DHS licenses the possession, use, transfer, and disposal of certain radioactive materials at SSFL. For further information, contact: Mr. Steve Hsu, Telephone: (916) 322-4797.

Ventura County Air Pollution Control District (VCAPCD): VCAPCD is responsible for regulating emissions of air contaminants at SSFL. VCAPCD has no regulatory authority over radionuclide emissions. For further information contact: Mr. Karl Krause, Telephone: (805) 645-1444.

Ventura County Environmental Health Division (VCEHD): VCEHD is responsible for implementing a number of environmental programs relating to underground storage tank management, hazardous materials inventory, and spill prevention countermeasures. For further information, contact the VCEHD front desk, Telephone: (805) 654-2813.

Los Angeles Regional Water Quality Control Board (LARWQCB): LARWQCB oversees surface water discharges from the SSFL. The National Pollutant Discharge Elimination System (NPDES) permit issued to the SSFL requires that discharges to surface waters are monitored and the resultant data reported to the LARWQCB monthly. For further information contact: Ms. Casandra Owens, Telephone: (213) 576-6750